

What is claimed is:

1. An automatic veterinary medicament delivery system, for delivery of at least one fluid medicament to an individual fowl, ovine, procine or other animal within a group, comprising:
  - a) a generally cylindrical, valve-free, hand-held injection device having a hollow needle for injecting a liquid,
  - b) tubing interconnecting said hand-held injection device in fluid communication with at least one liquid medicament;
  - c) a pump, in fluid communication with both said hand-held injection device and liquid medicament, said pump for forcing a medicament through said tubing to said hand-held injection device for delivery;
  - d) means for powering said pump; and
  - e) means for deterring accidental self-injection by a user of said system.

2. The system of claim 1, wherein said means for deterring accidental self-injection by a user further comprise an emergency stop button mounted on said hand-held injection device.

3. The system of claim 1, wherein said means for <sup>112 a, b, 7</sup> deterring accidental self-injection by a user further comprise a safety interlock, mounted on said proximal surface of said hand-held injection device, extending longitudinally therefrom to a point even with said needle tip, said safety interlock urged to a second position, in response to said hand-held injection device being positioned adjacent an animal to be injected, where the needle is inserted completely in said animal body, where an extension of said safety interlock within the housing of said hand-held injection device closes a circuit actuating an injection.

4. The system of claim 1, further comprising means for precisely controlling the amount of a medicament administered.

5. The system of claim 4, said means for precisely controlling the amount of medicament

administered further comprise a control unit where the dosage of the medicament to be administered is controlled by setting the number of pulses that are emitted by an electronic photo optic sensor in response to an amount of medicament passing therethrough.

6. The system of claim 5, further comprising means for readily indicating when in injection is taking place.

7. The system of claim 6, further comprising means for indicating when the medicament fluid level is low.

8. The system of claim 7, further comprising means for automatically delivering two medicaments for injection simultaneously by the system.

9. An automatic veterinary medicament delivery system, for delivery of at least one fluid medicament to an individual fowl, ovine, procine or other animal within a group, comprising:

- a) a generally cylindrical, valve-free, hand-held injection device having a hollow needle for injecting a liquid,
- b) tubing interconnecting said hand-held injection device in fluid communication with at least one liquid medicament;
- c) a pump, in fluid communication with both said hand-held injection device and liquid medicament, said pump for forcing a medicament through said tubing to said hand-held injection device for delivery;
- d) means for powering said pump;
- e) an emergency stop button mounted on said hand-held injection device as means for deterring accidental self-injection by a user of said system; and
- f) a control unit where the dosage of the medicament to be administered is controlled by setting the number of pulses that are emitted by an electronic photo optic sensor in response to an amount of medicament passing therethrough.as means for precisely controlling the amount of a medicament administered.

1 10. The system of claim 9, further comprising means for readily indicating when in injection is  
2 taking place.

3 11. The system of claim 10, further comprising means for indicating when the medicament fluid  
4 level is low.

5 12. The system of claim 11, further comprising means for automatically delivering two  
6 medicaments for injection simultaneously by the system.

7 13. An automatic veterinary medicament delivery system, for delivery of at least one fluid  
8 medicament to an individual fowl, ovine, procine or other animal within a group, comprising:

- 9 a) A generally cylindrical, valve-free, hand-held injection device having a hollow  
10 needle for injecting a liquid,  
11 b) tubing interconnecting said hand-held injection device in fluid communication with  
12 at least one liquid medicament;  
13 c) a pump, in fluid communication with both said hand-held injection device and  
14 liquid medicament, said pump for forcing a medicament through said tubing to said  
15 hand-held injection device for delivery;  
16 d) means for powering said pump;  
17 e) a safety interlock , mounted on said proximal surface of said hand-held injection  
18 device, extending longitudinally therefrom to a point even with said needle tip, said  
19 safety interlock urged to a second position, in response to said hand-held injection  
20 device being positioned adjacent an animal to be injected, where the needle is  
21 inserted completely in said animal body, where an extension of said safety  
22 interlock within the housing of said hand-held injection device closes a circuit  
23 actuating an injection as means for deterring accidental self-injection by a user of  
24 said system; and  
25 f) a control unit where the dosage of the medicament to be administered is controlled

1 by setting the number of pulses that are emitted by an electronic photo optic sensor  
2 in response to an amount of medicament passing therethrough as means for  
3 precisely controlling the amount of a medicament administered.

4 14. The system of claim 13, wherein said control unit further comprises:

- 5 a) a photo-optic sensor to control the volume of medicament fluid pumped by said  
6 pump;  
7 b) a circular encoder disc, having slots formed in said encoder disc placed at a  
8 calibrated distance from one another around the perimeter of said encoder disc;  
9 c) a drive shaft, driven by said pump, for driving said encoder disc wherein said slots  
10 pass between an emitter and a receiver of said photo-optic sensor permitting  
11 calibration of the amount of said medicament dispersed.

12 15. The system of claim 14, further comprising means for readily indicating when in injection is  
13 taking place.

14 16. The system of claim 15, further comprising means for indicating when the medicament fluid  
15 level is low.

16 17. The system of claim 16, further comprising means for automatically delivering two  
17 medicaments for injection simultaneously by the system.

18 18. The system of claim 1, wherein a first hand-held injection device further includes:

- 19 a) a trigger, in electrical communication with said pump, mounted on a dorsal  
20 surface of said device;  
21 b) an emergency stop button mounted on a dorsal surface of said device as means for  
22 deterring accidental self-injection of the user;  
23 c) a head lamp mounted on the proximal surface of said device, for providing  
24 illumination in low light areas and as a further warning to the user to avoid self-  
25 injection; and

1 d) an injection in progress light mounted on said housing of said device.

2 19. The system of claim 1, wherein a second hand-held injection device further includes:

- 3 a) a trigger, in electrical communication with said pump, mounted on a dorsal surface  
4 of said device;
- 5 b) an emergency stop button mounted on a dorsal surface of said device as means for  
6 accidental self-injection of the user;
- 7 c) a head lamp mounted on the proximal surface of said device, for providing  
8 illumination in low light areas and further as a warning to the user to avoid self-  
9 injection;
- 10 d) an injection in progress light mounted on said housing of said device; and  
11 e) optional dye marking means for conspicuously marking an animal injected,  
12 simultaneously with the injection.

13 20. The system of claim 1, wherein a third hand-held injection device further includes:

- 14 a) a second hollow needle, mounted on a proximal surface of said device, for  
15 injecting two medicaments simultaneously;
- 16 b) a trigger, in electrical communication with said pump, mounted on a dorsal surface  
17 of said device;
- 18 c) an emergency stop button mounted on a dorsal surface of said device as means for  
19 deterring accidental self-injection of the user;
- 20 d) a head lamp mounted on the proximal surface of said device for providing  
21 illumination in low light areas and further as a warning to the user to avoid self-  
22 injection; and
- 23 e) an injection in progress light mounted on said housing of said device.

24 21. The system of claim 1, wherein a fourth hand-held injection device further includes:

- a) a trigger, in electrical communication with said pump, mounted on a pistol grip handle mounted on said device;
- b) a safety interlock mounted on the proximal surface of said device as means for deterring accidental self-injection of the user;
- c) a head lamp mounted on the proximal surface of said device, for providing illumination in low light areas and further as a warning to the user to avoid self-injection;
- d) an injection in progress light mounted on said housing of said device; and
- e) optional dye marking means for conspicuously marking an animal injected, simultaneously with the injection.

22. The system of claim 18, 19, 20, or 21, wherein said hand-held injection device selected is installed for fluid connection with the system by means of a quick connect fluid coupler connecting to said pump.

23. The system of claim 22, wherein said hand-held injection device selected is installed for electrical connection by means of an amp electrical connector to said control unit for powering said selected hand-held injection device.

24. The system of claim 23, wherein said control unit permits selecting appropriate doses to be delivered by said selected hand-held injection device.

25. The system of claim 24, wherein said control unit further comprises:

- a) a photo-optic sensor to control the volume of medicament fluid pumped by said pump;
- b) a circular encoder disc, having slots formed in said encoder disc placed at a calibrated distance from one another around the perimeter of said encoder disc;
- c) a drive shaft, driven by said pump, for driving said encoder disc wherein said slots pass between an emitter and a receiver of said photo-optic sensor permitting

1 calibration of the amount of said medicament dispersed.

2 26. The system of claim 1, wherein the pump is a self-priming peristaltic pump permitting valve-  
3 free system.

4 27. The system of claim 1, wherein two different medicaments are automatically mixed, by means  
5 of a mixing tube, to permit injection of two different medicaments in a single injection procedure.

6 28. The system of claim 27, wherein said mixing tube, for mixing two fluids, further comprises:

- 7 a) a T-shaped coupling interconnecting said two fluid sources;  
8 b) a cylinder having a first, intake end and a second exit end; and  
9 c) a double helix-shaped fin retained within said cylinder that, when two fluids are  
10 introduced through said T-shaped coupling, said fluids are intermixed as they are  
11 pushed down said fin before exiting said cylinder.

12 29. An automatic veterinary medicament delivery system, for delivery of fluid medicaments to an  
13 individual fowl, ovine or other animals, comprising:

- 14 a) a hand-held injection device for injecting the medicament;  
15 b) a source of medicament;  
16 c) tubing interconnecting said injection device and source of medicament;  
17 d) a pump, in fluid communication with both said injection device and said source of  
18 medicament, for forcing the medicament through said tubing from said medicament  
19 source to said injection device for delivery;  
20 e) means for powering said pump;  
21 f) means for precisely controlling the amount of medicament administered;  
22 g) means for readily indicating when an injection is taking place;  
23 i) means for indicating when the medicament fluid level is low;  
24 j) means for preventing inadvertent injection by a user of the system; and  
25

- 1 k) means for automatically delivering two medicaments for injection simultaneously  
2 by the system.

3 30. The system of claim 1, further comprising a method of cleaning the system wherein a pump  
4 switch on the face of said control unit is set to "forward" in order to circulate cleaning/sanitizing  
5 solutions for effective "clean in place" of the system.

6 31. A method of delivering two medicaments simultaneously without mixing the medicaments,  
7 further comprising the steps of:

- 8 a) providing an automatic veterinary medicament delivery system of claim 1,  
9 b) installing a second pump, interconnected by drive shaft to a first pump;  
10 c) interconnecting tubing between each medicament and their respective pump; and  
11 d) interconnecting tubing between said pumps and a hand-held injection device of  
12 claim 20.

13 32. A method of delivering two medicaments simultaneously without mixing the medicaments,  
14 further comprising the steps of:

- 15 a) providing an automatic veterinary medicament delivery system of claim 1;  
16 b) installing a second control unit with an additional pump mounted thereon;  
17 c) interconnecting tubing between each medicament and their respective pump; and  
18 d) interconnecting tubing between said pumps and a hand-held injection device of  
19 claim 20.

20 33. A method of delivering two medicaments simultaneously, further comprising the steps of:

- 21 a) providing an automatic veterinary medicament delivery system of claim 1;  
22 b) installing a second pump, interconnected by drive shaft to a first pump;  
23 c) interconnecting tubing between each medicament and their respective pump; and  
24 d) interconnecting tubing between said pumps and a mixing tube and hand-held  
25 injection device of claim 18, 19, or 21.



1 34. An automatic veterinary medicament delivery system, for delivery of at least one fluid  
2 medicament to an individual fowl, ovine, porcine or other animal within a group, comprising:  
3 a) a hand-held injection device for delivery of the medicament through a hollow  
4 needle is housed within a head portion of said gun; <sup>112</sup>  
5 b) said injection device further including a housing with a head portion and a handle  
6 portion, said portions being pivotally connected  
7 c) a source of medicament;  
8 d) means for measuring the amount of medicament delivered;  
9 e) tubing interconnecting said gun and said source of medicament;  
10 f) a self-priming peristaltic pump, external to said gun, in fluid communication with  
11 both said gun and said source of medicament, for forcing the medicament through  
12 said tubing from said medicament source to said gun for delivery; and  
13 g) means for powering said pump.

14 35. The system of claim 34, further comprising a spring-loaded retractable safety interlock  
15 adjacent said needle wherein spring biasing means urges said safety interlock into a first  
16 position extending longitudinally at least as far as the tip of said needle and means are  
17 further provided for overcoming said spring biasing means, urging said safety interlock  
18 into a second position wherein said needle is extended longitudinally beyond said safety  
19 interlock and closing an electrical switch which actuates said pump causing release of  
20 fluid through said needle.

21 36. The system of claim 35, wherein a trigger is mounted on the housing, said trigger in  
22 electrical communication with the pump and in conjunction with the safety interlock  
23 switch, wherein when said trigger is depressed, said safety interlock is biased to a second  
24 position actuating said switch and completes the electrical circuit and actuates said pump  
25 to power the injection device to deliver medicament to the animal or fowl to be  
26 injected, said trigger deterring accidental self-injection.

1 37. The injection device of claim 34, wherein said housing, having said head portion and said  
2 handle portion with said pivot, may be adapted for a linear alignment of said head portion and said  
3 handle portion to facilitate different positions for delivery of medicament such that re-positioning  
4 said housing changes the angle of injection.  
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